Polynomial Factoring solution (version 631)

1. **The quadratic formula says if** $ax^2 + bx + c = 0$ **then** $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$. **Use the quadratic formula to solve the following equation.**

$$x^2 + 8x + 34 = 0$$

Simplify your answer(s) as much as possible.

Solution

$$x = \frac{-(8) \pm \sqrt{(8)^2 - 4(1)(34)}}{2(1)}$$

$$x = \frac{-(8) \pm \sqrt{64 - 136}}{2(1)}$$

$$x = \frac{-8 \pm \sqrt{-72}}{2}$$

$$x = \frac{-8 \pm \sqrt{-36 \cdot 2}}{2}$$

$$x = \frac{-8 \pm 6\sqrt{2}\, i}{2}$$

$$x = -4 \pm 3\sqrt{2}\, i$$

Notice that i in NOT under the square-root radical symbol!!

2. **Express the product of** $7 + 8i$ **and** $-5 - 3i$ **in standard form** $(a + bi)$.

Solution

$$(7 + 8i) \cdot (-5 - 3i)$$

$$-35 - 21i - 40i - 24i^2$$

$$-35 - 21i - 40i + 24$$

$$-35 + 24 - 21i - 40i$$

$$-11 - 61i$$

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3. **Write function $f(x) = x^3 - x^2 - 36x + 36$ in factored form. I'll give you a hint: one factor is $(x + 6)$.**

Solution

$$
\begin{array}{r|rrrr}
 & 1 & -1 & -36 & 36 \\
-6 & & -6 & 42 & -36 \\
\hline
 & 1 & -7 & 6 & 0
\end{array}
$$

$$f(x) = (x+6)(x^2 - 7x + 6)$$

$$f(x) = (x+6)(x-6)(x-1)$$

4. **Polynomial p is defined below in factored form.**

$$p(x) = (x+7) \cdot (x+4)^2 \cdot (x-1) \cdot (x-6)^2$$

Sketch a graph of polynomial $y = p(x)$.